

**SURVEY AND ABUNDANCE OF NATURAL ENEMIES OF THE  
 COTTONY CAMELLIA SCALE, *Pulvinaria floccifera* (WESTWOOD)  
 (HOMOPTERA: COCCIDAE) IN EGYPT.**

**BY**

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**ABSTRACT**

The cottony camellia scale, *Pulvinaria floccifera* (Westwood) (Homoptera: Coccidae) attacks different economic crops in Egypt. Surveys and abundance conducted during 2002 / 2003 season in different localities in Egypt revealed the presence 22 natural enemies were associated with this pest (9 parasitoids and 12 predators). In addition, one hyperparasitoid was unfortunately secured. Abundance of these natural enemies indicated that the encyrtid parasitoid, *Microterys flavus* (Howard) is the promising species in controlling this pest; a maximum of 66% parasitism was recorded during October, 2002, in El-Arish region. On the other hand, the predator, *Exochomus flavipes* Thrum is the dominant coccinellid predator associated with pest; a maximum 65 individuals/30 leaves was recorded during September 2002, in the same above-mentioned region.

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**Key Words:** *Pulvinaria floccifera*, Coccidae, natural enemies, Egypt.

**INTRODUCTION**

The cottony camellia scale, *Pulvinaria floccifera* (Westwood) (Homoptera: Coccidae) attacks 39 host plants distributed in different parts of the world (Ben-Dov, 1993). As all soft scales, it attacks all parts of the plants: leaves, stem, bark, crowns and root (Hamon and Williams, 1984) and the severity of damage caused by this scale is graded according to the level of infestation. At the lowest level, sucking the sap is the only damage. This is followed by the appearance of honey dew on the leaves, resulting in spread of sooty mould. Then, more serious symptoms appear, such as the fall of leaves extending gradually to an almost complete defoliation and entire branch dryness on the tree. Severe infestation do not result in the death of tree, but cause the reduction or even absence of yield for a number of years (El-Minshawy and Moursi, 1976).

The natural enemies of this species coccid were previously recorded by many workers (Peck, 1963; Krombein *et al.*, 1979; Yasnosh and

Mjavanadze, 1983; Mzhavadze, 1984; Hamed and Hassanien, 1991 and Abd-Rabou, 2001).

The present work deals with the survey and abundance of the natural enemies of this pest in different localities of Egypt.

### MATERIAL AND METHODS

A survey of natural the enemies of *P. floccifera* was carried out all over Egypt during 2002/2003. Leaves, leaflets, stems and fruits from different host plants were collected and placed separately in paper bags for further examination in the laboratory. Materials were also kept in a well-ventilated container until emergence of any parasitoids and / or hyperparasitoids. Identification of parasitoids, hyperparasitoids and predators was made by examining their mounted adults in Hoyer's medium and cards (Noyes, 1982).

The seasonal abundance of the natural enemies *P. floccifera* was carried out on host plant *Psidium guajava* in El-Arish (North Sainai), Beheira and Beni-Suef Governorates from April 2002-to March 2003. The plant area selected for these investigations did not receive any chemical control measure for several years. Ten trees of *P. guajava* almost similar in age, shape, size and growth condition were randomly chosen for sampling at a month intervals for each location. In each sampling, 30 leaves and 15 twigs (20cm. long) were chosen at random and examined immediately in the field for counting the number of predators. Thereafter, the leaves and twigs were kept in a closed paper bags to be transferred to the laboratory for further examination. Materials were also kept in a well-ventilated container until the emergence of any parasitoids and/or hyperparasitoids that were counted and recorded to estimate the percentage parasitism. The percentage parasitism determined by dividing the number emerging parasitoids by the number of *P. floccifera*.

### RESULTS AND DISCUSSION

Twenty one of the natural enemies of *P. floccifera* were secured, 9 parasitoids and 12 predators. In addition, a hyperparasitoid was unfortunately recorded. These bio-agent could be listed alphabetically as follows:

#### Parasitoids:

- Alaptus* sp. (Mymaridae, Hymenoptera)
- Coccophagus lycimnia* (Walker) (Aphelinidae, Hymenoptera)
- C. scutellaris* (Dalman) (Aphelinidae, Hymenoptera)
- Diversinervus elegans* Silvestri (Encyrtidae, Hymenoptera)
- Metaphycus flavus* (Howard) (Encyrtidae, Hymenoptera)
- M. helvolus* (Compere) (Encyrtidae, Hymenoptera)
- Microterys flavus* (Howard) (Encyrtidae, Hymenoptera)
- Paracerapterocerus africanus* Girault (Encyrtidae, Hymenoptera)
- Scutellista cyaneae* (Motschulsky) (Pteromalidae, Hymenoptera)

**Hyperparasitoid :**

*Marietta leopardina* Motschulskey (Aphelinidae, Hymenoptera)

**Predators:**

- Chilocorus bipustulatus* L. (Coccinellidae, Coleoptera)
- Chrysoperla carnea* (Stephens) (Chrysopidae, Neuroptera)
- Chrysopa septempunctata* Wesm (Chrysopidae, Neuroptera)
- Clitostethus arcuatus* Rossi(Coccinellidae, Coleoptera)
- Coccinella undecimpunctata* L. (Coccinellidae, Coleoptera)
- Exochomus flavipes* Thrum(Coccinellidae, Coleoptera)
- Haplothrips andresi* Priesner (Phloeothripidae, Neuroptera)
- Orius laevigatus* Fieb (Anthocoridae, Hemiptera)
- Paederus alferii* Koch(Steaphilinidae, Coleoptera)
- Rhizobius littura* Fab. (Coccinellidae, Coleoptera)
- Scymnus interruptus* Gois(Coccinellidae, Coleoptera)
- S. syriacus* Mars. (Coccinellidae, Coleoptera)

The distribution of these natural enemies varied from one locality to another. The population of the *P. floccifera* in the three localities under consideration were counted (Table 1). In El-Arish region four parasitoids, those were *D. elegans*, *M. flavus*, *M. helvolus* and *Mi. flavus* and the five predators, those were *C. carnea*, *C. undecimpunctata*, *E. flavipes*, *H.andresi* and *S. interruptus*

**Table (1): *Pulvinaria floccifera* monthly counts that were kept in laboratory for obtaining parasitoid species from different regions.**

Month	El-Arish	Beheira	Beni-Suef
April 2002	453	234	157
May	533	294	211
June	678	423	269
July	775	511	367
August	987	756	485
September	1012	835	502
October	1150	910	566
November	905	725	625
December	730	520	351
January 2003	535	412	216
February	310	298	143
March	385	156	98

In this region, the average percentages of parasitism by *D. elegans*, *M. flavus*, *M. helvolus* and *Mi. flavus* were in respective, 1.3, 1.5, 3.5 and 24.8%. Their peaks were in respective, 4% during Sept. 2002, 7% during Oct. 2002, 10% during Oct. 2002 and 66% during Oct. 2002 (Fig. 1). In the same locality, the predator *E. flavipes* was the most abundant one attacking *P. floccifera*. The greatest number recorded for this predator was 65 individuals

in the sample of September 2002 (Fig.4). Greatest counts of the other predators, *H.andresi*, *S. interruptus*, *C. carnea* and *C. undecimpunctata* were 29, 22, 15, 11 individuals/ 30 leaves and 15 twigs in the samples of September, October, July, and August 2002, respectively.

In Beheira region four parasitoids, those were *C. scutellaris*, *M. flavus*, *Mi. flavus* and *S. cyaneae*; one hyperparasitoids, *M. leopardina* and the five predators, those were *C. carnea*, *O. laevigatus* *R. littura*, *S. interruptus* and *S. syriacus*.

In this region, the average percentages of parasitism by *C. scutellaris*, *M. flavus*, *Mi. flavus*, *S. cyaneae* and *M. leopardina* were in respective, 4, 0.2, 5.1, 17.8 and 1.4%. Their peaks were in respective, 9% during Nov.2002, 1.7% during Oct. 2002, 15% during Sept., and 33.3 during Sept.2002 and 5.7% during Sept.2002 (Fig. 2)..

In the same locality, the predators, *R. littura* and *S. syriacus* are the most abundant predators attacking *P. floccifera*. The greatest numbers recorded for these predators was 21 and 20 individuals in the sample of September and October 2002 (Fig. 5).. Greatest counts of the other predators, *C.carnea*, *S.interruptus* and *O. laevigatus* were 14, 8 and 2 individuals / 30 leaves and 15 twigs in the samples of September, October and October 2002, respectively.

In Beni-Suef region three parasitoids those were *C. lycimnia*, *P. africanus* and *Alaptus* sp. and and three predators those were *C. bipustulatus*, *C. arcuatus* and *P. alfierii*.

In this region, the average percentages of parasitism by, *C. lycimnia*, *P. africanus* and *Alaptus* sp. were in respective, 7.8, 2.8, and 0.5%. Their peaks were in respective 20% during Oct. 2002, 8% during Oct. 2002 and 2.7% during Oct.2002 (Fig. 3).

In the same locality, the predator, *C. bipustulatus* is the most abundant predator attacking *P. floccifera*. The greatest number recorded for this predator was 17 individuals in the samples of October 2002 (Fig. 6). Greatest counts of the other predators, *C. arcuatus* and *P. alfierii* / 30 leaves and 15 twigs 5 and 10 individuals in the samples of September and November 2002, respectively.

Abou-Elkhair 1999, reported the parasitoids, *Coccophagus* sp., *M. flavus* and *S. cyaneae* associated with different species of soft scale insects in Alexandria. In 2001, Abd-Rabou recorded the six parasitoid species *C. lycimnia*, *C. scutellaris*, *D. elegans*, *M. flavus*, *Mi. flavus* and the hyperparasitoid, *M. leopardina* on the soft scale insect *P. floccifera*. In the present work the four parasitoid species *Alaptus* sp., *M. helvolus*, *P. africanus* and *S. cyaneae* were recorded for the first time in Egypt. During this study it appeared that, *Mi. flavus* was the most effective parasitoid attacking *P. floccifera*; showing a general average rate of 24.8% and a maximum parasitism rates of 66%.

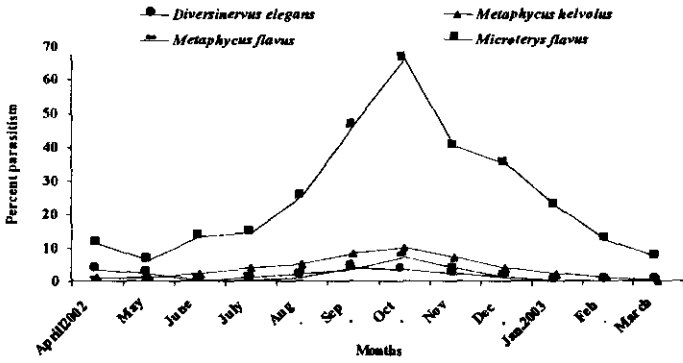


Fig. 1 : Percent parasitism of *Pulvinaria floccifera* by different parasitoids in El-Arish in Egypt

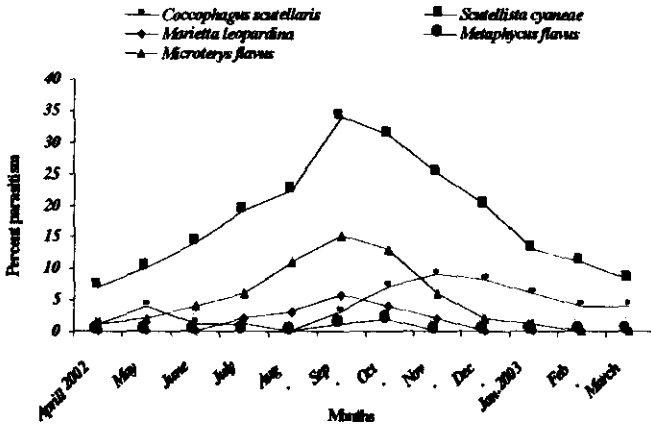


Fig. 2 : Percent parasitism of *Pulvinaria floccifera* by different parasitoids in Beheira in Egypt

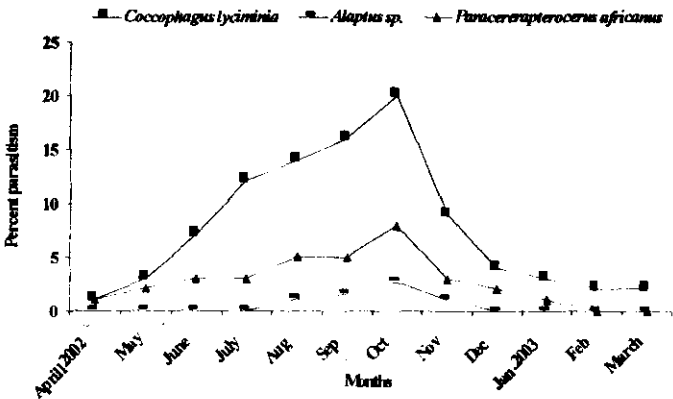


Fig. 3 : Percent parasitism of *Pulvinaria floccifera* by different parasitoids in Beni-Suef in Egypt

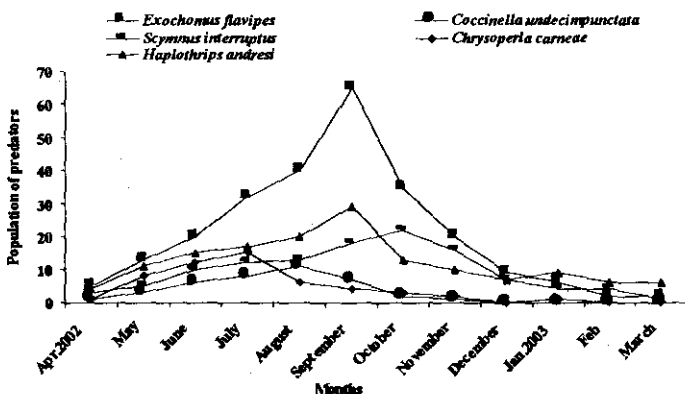


Fig4: Population counts of different predators species of *Pulvinaria floccifera* in El-Arish in Egypt

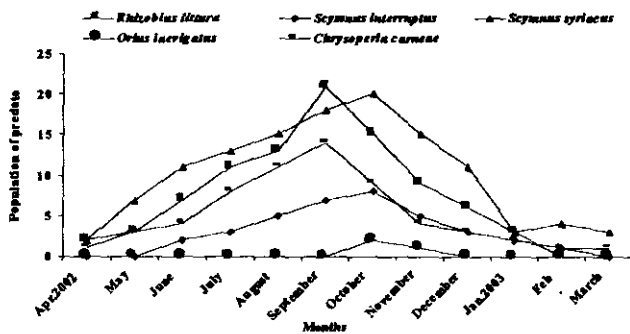


Fig5: Population counts of different predators species of *Pulvinaria floccifera* in Behira in Egypt

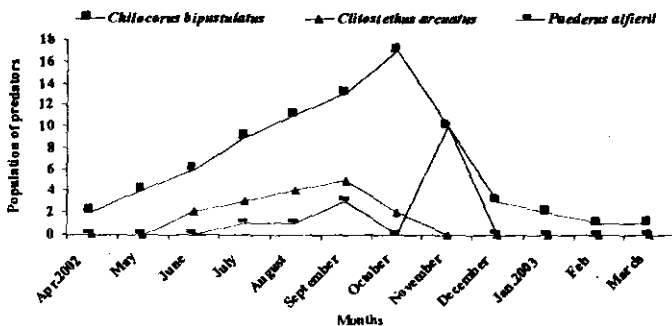


Fig6: Population counts of different predators species of *Pulvinaria floccifera* in Beni-Suef in Egypt

The predators, *C. bipustulatus*, *S. syriacus*, *Pharoscygnus varius* Kirsch, *Rodalia cardinalis* Muls., *C. septempunctata* and *O. laevigatus* were previously recorded feeding on some soft scale insects in Egypt (El-Agamy *et al.*, 1994, Hamed and Hassanien, 1991 and Hendawy, 1999). Hendawy (1999) reported that the highest peak of soft scale insects was detected in November is coincided with the highest peak of its predators. Therefore the population of predators declined gradually to peak in May just before that of scale insects. Another peak of the predators occurred during August, directly after the peak of scale insects. In the present work, it was found that the actived period of the predators of *P. floccifera* extended from July to November. The predator, *E. flavipes* is considered the most dominant predator on the cottony camellia scale in Egypt.

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### الحصرو التوزيع الموسمي للأعداء الحيويه لحشرة الكاميليا الرخوة فى مصر

شعبان عبدربه ، هدى بداري

مركز البحوث الزراعية- معهد بحوث وقاية النباتات-الدقى - جيزة

حشرة الكاميليا الرخوة تهاجم العديد من المحاصيل الاقتصادية فى مصر. تم عمل الحصرو التوزيع الموسمي للأعداء الحيويه لحشرة الكاميليا الرخوة فى مصر لمدة عام (أبريل ٢٠٠٢ / مارس ٢٠٠٣) وقد أشارت النتائج أن لهذه الآفة ٢١ عدوا حيويا منهم ٩ طفيليات أوليه و ١٢ مفترس هذا وقد تم حصر طفيل ثانوي واحد. وقد أشار التوزيع الموسمي الى أن الطفيل *Microterys flavus* يعتبر من الطفيليات الواعده التى يمكن أن تكافح هذه الآفة إذ وصلت أعلى نسبة تطفل الى ٦٦% أثناء أكتوبر ٢٠٠٢ فى منطقة العريش. بينما المفترس *Exochomus flavipes* يعتبر من المفترسات السائده على حشرة الكاميليا الرخوة إذ كان أعلى تعداد لها قد وصل الى ٦٥ فرد لكل ٣٠ ورقه و ١٥ غصنا ، أثناء سبتمبر ٢٠٠٢ فى منطقة العريش أيضا.